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RESEARCH ARTICLE

Definitions of the Degree of the Potential Erosion Danger of the Mountain Brown Soils of the Quba-Khachmas Zone of Azerbaijan

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ABSTRACT

On plots of fields under crops, the signs on which it is possible to determine the degree of erosion of soils are the inside covering and plant heights. With the enthusiasm of the steepness of the slopes, the possibility of using cultivated crops as indicators of soil erosion decreases. The degree of soil washout period of natural forage lands can be assessed on the basis of the dependence of the existing between the plant stand and the degree of soil erosion. Strongly eroded soil of slope meadows can be recognized by ecological care regimes of habitats of vegetation.

Key words: Mountain, Quba-Khachmas Zone, Soil

INTRODUCTION

In the context of Azerbaijan, the process of erosion has become a large development, calling for a washout, erosion and deflation, etc. types of unwanted consequences of destroying the aggregate properties of soils. It is expressed most clearly in the soils, cultivated in rainfed conditions in the example object. The aim of achieving completeness solvable problems of land management, erosion or potentially dangerous erosion should be deeply know every plot of land in the region, its features that can influence the choice of crops in the territory of the possible only as a result of deep surveys the territory. We should also recognize that the stronger are affected by erosion of the soil, the more they differ from their unwashed analogs on chemical, granulometric composition, and physical and chemical properties, water, air, and thermal regimes of biogenic and other indicators, which together affect their fertility and erosion resistance.[1-4]

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THE MOVES AND DISCUSS THE RESULTS OF THE STUDY

As a result, undertaken under the direction of Prof. B.H. Aliyev[5] research jointly with experts of the Polish Institute of technology revealed that soil erosion is reduced humus content. However, the margin when 0–50 cm layer in nesmytyh mining and steppe similar Brown soils is 168 t/ha, in a very slabosmytyh-156t/ha, slobosmytyh-135 t/ha, srednesmytyh-108 t/ha, silnosmytyh-65 t/ha, and in very silnosmytyh-32 t/ha.

In eroded soils not only decreases the total humus content but also decreases the contents of mobile forms of humus acids. According to the author, these changes are the stronger, the more are affected by erosion of the soil.

It is believed that the decrease of humus acids leads to lower fertility, conservation of soil resistance to deterioration. This same decline, in general, proportional to the reduction of nitrogen in the soil. Shortage of available forms of nitrogen is one of the important reasons for the decline of fertility of eroded soils.

Regularity also reveals decreasing r_20 in moderate washed out soils by 30% and - stronger washed away - more than 50%. Reduction of organic

phosphates and phosphorus forms insoluble increase leads to deterioration of phosphorus nutrition of plants. In eroded soils are often reduced content of potassium. Thus, its agrochemical characterization of soil washed away is substantially different from unwashed. Hence, arises the need for differentiated fertilization in soil with varying degrees of erosion.
Results of laboratory studies found that eroded soils differ significantly from not eroded on physical properties. In the eroded soils decreases the content of waterproof structural aggregates.
And so, if in the upper horizon of mountain-unwashed Brown step-down soil durable water content of the aggregates is 52% very slabosmytyh-48%, slabosmytyh-42%, srednesmytyh-30%, strongly washed 18%, and in very silnosmytyh-8%. The number of units of <0.25 mm increments [Table 1].
Note that not eroded soils are distinguished from eroded visible differentiation of soil profile and greater capacity. In the past appears gray brown shade effect of alluvium horizon are well allocated arable and in two layers. Subsurface layer is visibly detectable seal and meet the selection of carbonates. Structure of silt-clotted, and Virgin soil-clotted well expressed. The degree of erosion for each soil type is set, depending on which part of the soil profile washed away or deformed horizon from which topsoil is emerging, what is the average percentage yield compared to harvest on/non-eroded soils, and the steepness of slope in degrees. The degree of erosion of soil also depends on the shape of the slope, its length and exposure, the correctness of management, anti-erosion of sustainability, which includes a variety of mechanical, chemical, and physical properties. Therefore, on the slopes of the same slope soils can be one, but different subtype of erosion.
The average harvest is a very important indicator in determining the degree of erosion. In the field, soil fertility was determined visually by morphological hallmark of a soil profile and as plants on this site. From the data Table 1. It can be seen that as the degree of erosion decreased the power of the horizon a + b and reserve of humus within certain limits.
It should be noted that the supply of humus (in tones) is calculated taking into account the nitrogen and phosphorus. In addition, data on crops as listed in the classification of eroded soils, somewhat understated. Our nursery (2008-2010) studies have shown that the harvest of winter wheat at very little eroded mountain brown soils in the rolling average is reduced to 10% for medium-up to 25% of eroded, and the strong eroded up to 75% compared with crops on soils which not subject to erosion/and approved the results of long-term researches of experts of Institute for land reclamation and grassland of the NDP. To achieve this goal, the potential dangers of erosion mapping based on local characteristics of soils, we adopted the following grouped by degree of soil erosion.
Eroded land, which is set depending on the steepness and slope exposure, the depth of local bases, erosion degree of erosion, the nature of the underlying rocks, belonging to one or other agricultural lands.
Graduation steepness of slopes for arable land was taken as follows: 0–1; 1–3; 3–5; 5–8; 8–12 and more than 12. Other land: 0–1; 1–3; 3–5; 5–8; 8–12; 121–20; 20–30; 30–45 and more. On the slopes following graduation be taken exposure: North, Northeast, Northwest, East, West, South West, South East, and the South. Where depth graduation local bases were taken following erosion: 0–20; 20–50; 50–100; 100–150; 150–200; 200–3004 300–400; 400–500; 500–600; 600–800; 800–1000 m and more. According to the degree of erosion of different categories of eroded land kept as soil one degree of erosion and their complexes.[6-8]
Furthermore, take into account the nature of the underlying rocks and their density. For each of

Table 1: Diagnostic indicators of varying degrees of erosion the mountain- steppe similar brown soils

The degree of erosion and its designation	Power horizons a+b	Gross margin, t/ha			Durable water aggregates more than 1 mm	Yield kg/ha
		Humus	Nitrogen	Phosphorus		
Not eroded	75	168	10.5	6.4	52	28.5
Very little eroded	70	156	8.8	5.8	48	26.2
Weakly eroded	60	135	7.6	5.0	42	22.3
Moderately eroded	45	108	5.6	3.2	30	15.8
Heavily eroded	30	65	3.8	2.3	18	9.8
Very heavily eroded	<15	32	1.9	1.2	8	6.4

the selected groups and categories of eroded land have been given recommendations on their use and application of counter-erosion activities. As the above selection basis relied on eroded land are soil maps that reflect all the contours of eroded soils and farmland. While used and supporting special cards steepness, exposure, slopes, and depth of local bases of erosion.

In recent years there has been significant growth in the areas of eroded soils that required for thorough research and allocation of eroded land, which was not previously considered. Consequently, the question arises of the diagnostic study of indicators for measuring the degree of erosion of soil. Sometimes use indicators that determine the risk of erosion. For example, in some cases, assessment of erosion of arable soil set based on the data distribution of arable land on the slope. Of course, the steeper slopes, so all things being equal on them increase the degree of soil erosion. However, these are not always equal terms, so the soil more steep slopes may be less inclined than are affected by erosion [Table 2] as can be seen from the table, in the north-eastern part of the Greater Caucasus arable land on terrain conditions are more acceptable-pleasant than the South-East or South of the Greater Caucasus. Therefore, the soil cover is relatively less eroded. This is largely due to the relatively higher conservation soil stability, acceptable-pleasant rainfall, and soil-protective role of vegetation. Acceptable-pleasant rainfall and soil protection role of vegetation.

Soil erosion studies in Azerbaijan showed that factor exposure slopes more often affect the distribution of eroded soils than the steepness of slopes.

Therefore, when conducting a survey in the forest zone, the mountain brown soils, stepped on one of the areas with a slope of 15–200 on the southern slope of highly prone soil erosion, were found on the slopes of the northern exposure with a slope of 15–200 -weak erosion.

It was found a great influence on the distribution of soil exposure. So on the slopes of the Northern exposure when slopes 8–12° mountain-brown stepped soils wash is 19.2 m/ha, while similar conditions southern exposure reaches soil washout 45.8 m/ha. If on the slopes of the southern exposure medium and highly prone to erosion, soils occupy 41.2% of the area, on the slopes of Northern exposure in similar circumstances-just 9.8%.

Square units of each category and groups of eroded land have been calculated, taking into account the genetic soil types. As a result, became possible be explication of eroded land of Azerbaijan. In explicating contains data on the number of each type of eroded soils varying degrees of erosion on slopes or another surface, consisting of various agricultural land. Further synthesis of erosion of land is to bring them into the Republican maps, where, with the aim

Table 2: Distribution of arable land on the steepness of the slopes and soil erosion administrative areas of the northeastern part of the Greater Caucasus

Control areas	Total area ha	The steepness of the slopes			Eroded from the entire arable land	
		Cooler 10, ha/%	Including steeper		Total hectares/ percent	Including a strong and very badly-eroded ha/%
			50, ha/%	80 ha/%		
Cuba	20,402	15,028 / 73.7	10,385 / 50.9	2898 / 14.2	13,465 / 66.0	2845 / 13.9
Kusar	31,586	23,485 / 74.4	19,147 / 60.6	46.25 / 14.6	22,066 / 69.9	4333 / 13.7
Davaci	19,421	15,418 / 79.3	11,695 / 60.2	3420 / 17.6	14,829 / 76.4	3127 / 16.1
Siyazan	10,767	9708 / 90.2	7142 / 63.3	2138 / 19.9	8708 / 80.9	1942 / 18.0
Khachmaz branch	39,624	14,225 / 35.9	327 / 0.8	-	11,890 / 30.0	538 / 1.4
Total	121,800	77,864 / 63.9	486 / 40.0	13,081 / 10.7	70,958 / 58.0	12,785 / 10.5

of zoning activities rise shows the dependence of the soil cover. To highlight eroded territories the following gradation of the basis for the allocation of eroded land. Based on the data mapping of eroded soils, as well as the cameral works compiled map of soil erosion of the Azerbaijan Republic with the following application:

1. Area lack of erosion:
   - Do not subject to erosion under forests
   - Not prone to soil erosion, natural senecos, and occupied marsh vegetation
   - Soil, confined to such lands, as deposits, gardens.
2. Area subject to erosion:

Depending on the amount of soil with varying degrees of destruction of genetic horizons lands are divided into five groups:

- Very little eroded land, where weakly washed a difference constitutes no more than 10% and silnosmytye soils are not available
- Weakly eroded land, where the total area of eroded differences is 25%. Area weakly washed –20% medium degree washed away soil-not more than 5%, and strong degree washed away soils are not available
- Middling soil eroded. Only up to 50% of eroded soils. Square of contours with medium soils eroded reaches 30%, slightly eroded-to 15% and heavily-eroded -up to 5% and very heavily-eroded is 10%
- Heavily eroded soils. Jerodirovannost soils are about 75% of the total area. Of these, silnojerodirovannye-40%, - medium-eroded - to 25%, and very silnojerodirovannye-10%
- Highly heavily-eroded soils. Eroded area accounted for more than 75%. Very silnojerodirovannye-bolee50%, medium, heavily-eroded -more than 25%.

Given our experience, we fully share the views of F.S. Kozmenko, G.A. Presnyakova, S.S., Sobolev K. Alekperova, M.N. Zaslavsky that coloring the top layer of soil can be taken as the rate of erosion. In not washed -color dark brown, humus content-5%, nitrogen-0.30%, fosfora-0.22%, capacity-35 m/ekv absorption on 100 g of soil, structural units resistance to water -mm over 1 km with 52%.

Very poorly washed away

Horizon and washed not more than 20%, the color of the soil a little different from unwashed (dark brown). Humus content in the upper horizon is 4.6%, nitrogen-0.28%, phosphorus-0.19% absorption capacity-32.5 mm/ekv on 100 g of soil, the number of water resistance units over 1 mm 48%. Yields below 10% than that unwashed…

Poorly washed away

Horizon and from 20% to 50% washed soil color brown, humus content-4%, nitrogen-0.24%, phosphorus-0.16%, absorption capacity-CIECA 28.8 to 100 g of soil, the number of water resistance units-48%. Yields below (from 10 up to 25%) unwashed soils.

Medium washed away

Horizon and washed away completely. soil color is light brown, humus content-2.8–0.18% nitrogen, phosphorus-0.10%, absorption capacity is 23.8 CIECA on 100 g of soil, water-resistance units-30% productivity below from 25% to 50% than that of nesmytyh.

Heavily washed away

Wash off the horizon in, the color of the soil -j yellowish with brownish tinge. The content of humus-1.2–0.08% nitrogen, phosphorus-0.05%, absorption capacity is 14.5–100 g of soil CIECA, water resistance units-18%, yield-from 50% to 75% [Table 3].

Table 3: The degree of soil erosion

The degree of erosion	Genetic horizons washout,%	Reducing the stock of humus,%	The condition of crops
Very little eroded	(A) up to 20	<10	Good
Weakly eroded	(A) 20–50	10–25	Slightly below average
Moderately eroded	(A) fully	25–50	Average
Heavily eroded	In about 50	50–75	Indented
Very heavily eroded	In fully	>75	Very bad

Very heavily washed away

Rinse off completely the soil layer on the surface of exposed, loose, and hardwoods.

General provisions for the classification of eroded soils are the following: Selection of diagnostic indicators to determine degrees of erosion of soil, suitable quantity allocated to degrees of erosion soil standards to ascertain their degree of erosion For. mining-Brown soil erosion degree stepped is invited to determine to reduce genetic horizons and reduce the content of humus in the horizons of a + b. very weak i eroded t is recommended to classify the soil in which the compared with non-eroded the reduction and horizon to 20% and up to 10% of humus, to weakly eroded respectively 10–25% to medium-eroded %, 25–50-silnojerodirovannym-50–75%. These graduation offered, taking into account the variation in the humus content in soil and unwashed laboratory error definitions. Determination of the degree of erosion of soils based on quantitative change in humus content in the surface layer of soil is an accurate and objective method that can be used in exposed soil mapping mining brown soil and stepped close to him on the genesis of soils.

Natural hayfields and pastures, are constantly covered with vegetation, considered the most effective form of conservation land. However, due to the deprivation of the protective cover on the slopes increased run-off of soil, which contributes to the erosive process.

In their geographical distribution of erosion on pasture appear in a certain area of subordination, which is confined to certain areas and bioclimatic is a product of the evolution of the bio-climatic Wednesday.

Depending on the degree of development of erosive process, the nature of vegetation, and soil generic breeds, each selected type of erosion is divided into subtypes and variants.[9,10]

Grouping of eroded soils of the republic covers the main natural-landscape zones, taking into account the landscape and climatic conditions of each zone. Highland climate differs from harsh long protracted winter snow and frost. Summers are short and cool. The average annual temperature does not exceed 3.2–4.1°, and the coldest month (January) range from –4.6 to –7.9°c, the temperature of the warmest month (July) is low, ranging from 12.9 to –13.7°c; the sum of temperatures above 10° very low and average does not exceed 800–600. Duration of the frost-free period 1–2 months, vegetation period lasts 90–120 days. Average number of approximately 610–1210 mm, moisture ratio 1.52–1.22, total solar radiation (annual) changes within 144–156 kcal/cm^2. For the climatic indicators of the whole territory of the highlands refers to wet (MD <0.45) and cold (ΣT >800) climatic type.

Floristic composition of the vegetation is extremely heterogeneous and varies with altitude. In the most elevated part of the vegetation canopy cover not provided-groups rocky (lichens, algae, etc.) For the alpine meadows are typical dense-ground meadows with cereals components. Subalpine meadows are represented by grain cereals, grasses, thickets of rhododendron, and in relatively dry parts of meadow-steppe communities, the main soil types are mountain-meadow, mountain-forest-meadow, and mountain-meadow-steppe. Agricultural production is weak, the zone is largely occupied by wealthy summer pastures and mowed lands and are the basis for the development of transhumance (sheep) and fodder production.

Alpine and subalpine meadows, the main area which is occupied by pastures, soil erosion is the factor, which is closely linked areas. Stripped of protective vegetation, soil sloping land cannott absorb the snow and rain water. This leads to an obsession with surface runoff which enhances ripple rivers. As a result of violations of the hydrological regime of the territory, which is due mainly to the removal of forest and grassy vegetation, knocking in the rivers of the mountain areas often seen very strong fluctuations in the volume of river flow. The large loss of runoff regime of river runoff deteriorates, like snow, and especially the force of snowfall years. This, in its turn, reduces irrigation capacity of rivers on the territory of the foothill Plains, necessitates the use of large irrigation and reclamation work.

Erosive processes that resulted from the degradation of the vegetation of pasture, contributing to a sharp drop in the productivity of pastures. Therefore, soil erosion and deterioration in the quality of grass processes are closely linked. A well-developed natural grass cover markedly increases the resistance of soils and erosion of the leachate may runoff. Development processes of erosion affect not only the quantitative indicators of pasture plants but also lead

Table 4: Classification of pasture erosion on hillsides

Stage	The degree of	Indicators
Embossment (tropinnity)	Very weak	The total area of paths: <10% of the account area
	Weak	10–25%
	Average	25–50%
	Strong	50–75%
	Very strong	75%

to a restructuring of phytocenosis. From the total area of 2402.3 hectares of mountain pastures over 1985, 8 thousand hectares or 82.7% are prone to erosion. Pastures depending on sub-band and exposure of the slope wash soil varies ot 50–125 m^3 ha. From these studies, derives that great economical importance is the study of pasture erosion in mountainous areas and the development of techniques to prevent and fight against it. When developing differential measures for the improvement and rational use of pastures, there is always a need for the classification and grouping of grazing land for their quality status. It should be noted, however, that classification pasture erosion has now developed enough. Moreover, even the phenomenon of erosion on pasture do not found a definite place in the common grouping of erosive processes, although the nature of the manifestations of pasture erosion is very much different from other types or categories of erosion.

On the classification of eroded soils of mountain pastures known works of some author: V.A Meeting, (1958), D.J. Mihjlova (1959), SW Kerimhanova (1972). In these works gives grouping soils grazing on a degree as they are destroyed. In the forms of accelerated erosion caused by human activities, have a lot in common. However, according to and from the reasons caused the manifestation of erosion, these forms have their own characteristics. The character manifestation of soil erosion of mountain pastures pretty sharply differs from erosion on cultivated hillsides. Erosion processes on the pastures start to develop normally, since damage to the turf.

Mountain pasture soil destruction process has no similarities with the formation of gullies and potholes. The length of the pits does not always exceed their width, and availability under lower-powered soil layer waterproof dense rocks brings not on no growth pits deep. Further growth in the size of erosion pits usually occurs through the broken walls, sliding down the slope of sod places preserved woven roots and reminiscent of education in the second stage of its development. Raised near each other erosive pits are often steep walls and expand, incorporate among themselves, forming patches or streaks of eroded soil. As the further destruction of the soil occurs more or less gradual alignment of through the shedding of microrelief, and under the influence of sloping lands runoff. This specificity of the appearance of erosion on mountain pastures requires, firstly, providing pasture erosion in independent or category subtype, second, development of appropriate soil classification according to the degree of their erosion. Based on long-term observations, taking into account the peculiarities of the destructive processes of soils under the influence of the unrestrained grazing of livestock, it is proposed that the draft classification pasture erosion on erosion degree [Table 4]. This includes the sequence of tufted deformation process layer.

Research indicates the possibility of using cultural vegetation cropland and grass native grasslands in order to clarify the erosive soil survey data.

CONCLUSION

The degree of soil washout period of natural forage lands can be accessed on the basis of the dependence of the existing between the plant stand and the degree of soil erosion. Strongly eroded soil of slope meadows can be recognized by ecological care regimes of habitats of vegetation.

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